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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,197

11/18/2005

Julian A Cluff

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EXAMINER

SKOVHOLT, JONATHAN

ART UNIT

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2877

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/528,197	Applicant(s) CLUFF ET AL.	
	Examiner JONATHAN SKOVHOLT	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 7 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 1-16 are objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "such that radiation *can be* reflected" (line 4 of claim 1) is indefinite because it is not clear if the radiation is reflected or if the radiation is not reflected. The examiner interprets that radiation *is* reflected between the reflective surfaces (as is mentioned in claim 1) for the remainder of this office action. In addition the limitation "that radiation *may be* reflected" (line 4 of claim 15) is also indefinite and is objected to for the same reasons as mentioned above. The examiner interprets that radiation *is* reflected between the reflective surfaces (as is mentioned in claim 15) for the remainder of this office action.

Claim Analysis

Apparatus claims must be structurally distinguishable from the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Limitations following "adapted for," "designed to," "can be," and "capable of" are not positive limitations and thus are not given patentable weight. See MPEP 2111.04. Specifically, these occur in:

- **Claim 3** "configured to vary the speed... with time", and
- **Claim 4** "configured to oscillate said element... most 40°".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5-6, 8-13, & 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chavanne et al. (US Patent 6,144,456) ("Chavanne").

Regarding **claim 1**, Chavanne teaches an apparatus for varying the path length of a beam of radiation, the apparatus comprising:

- an element (15) rotatably mounted about an axis (37), said element comprising two reflective surfaces (39a-d) in fixed relation to one another such that radiation may be reflected between said reflective surfaces and out of the element (see Fig. 1-4); and
- driving means for rotatably oscillating said element about said axis (as element (15) rotates, it oscillated between π and $-\pi$ radians) (col.2 ln.25-35, col.2 ln.46-67, col.4 ln.51-col.5 ln.8).

Regarding **claim 5**, Chavanne teaches all as applied to claim 1 above, in addition Chavanne teaches an apparatus wherein said element comprises a solid optic and said reflective surfaces are provided by surfaces of said optic (element (15) is a solid optic with an index of refraction of 1.5 or 2.5 and the reflective surfaces are provided at the surface of the optic (col.3 ln.53-62, col.4 ln.51-col.5 ln.8, col.5 ln.39-50, Fig. 1-4).

Regarding **claim 6**, Chavanne teaches all as applied to claim 5 above, in addition Chavanne is silent to an apparatus wherein the said reflective surfaces are metallised. Chavanne does teach reflective coatings on the reflections surfaces (col.3 ln.53-62, col.4 ln.51-col.5 ln.8)

It would be obvious to one of ordinary skill in the art to use metallised coatings to improve the reflectivity of the internal reflection surface within the solid optic (15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus from Chavanne with metallised coatings to improve the internal reflectance of the solid optic.

Regarding **claims 8-9**, Chavanne teaches all as applied to claim 5 above, in addition Chavanne teaches an apparatus wherein the solid optic comprises a material having a higher refractive index than 1 and a refractive index of at least 1.2 (col.3 ln.53-62, col.5 ln.39-50).

Regarding **claim 10**, Chavanne teaches all as applied to claim 1 above, in addition Chavanne teaches an apparatus further comprising a reflecting member configured to reflect radiation exiting the element back into the element (element (30) reflects radiation exiting element (15) back into element (15)), the reflecting member being configured such that radiation reflected back into the element exits the element along a fixed final exit path regardless of the rotational position of the element (col.2 ln.25-35, col.2 ln.46-67, col.4 ln.51-col.5 ln.8, Fig. 1-4).

Regarding **claim 11**, Chavanne teaches all as applied to claim 10 above, in addition Chavanne teaches an apparatus wherein radiation which enters the element for a first time follows a first path and the reflecting member is configured to reflect radiation back into the element such that the radiation reflected by the reflecting member follows the first path in

reverse (the incoming light into element (15) of Fig. 1 follows the same path after reflecting off of mirror (30)) (Fig. 1-4).

Regarding **claim 12**, Chavanne teaches all as applied to claim 11 above, in addition Chavanne teaches an apparatus wherein said reflecting member is provided with polarisation translation means (19b, Fig. 1).

Regarding **claim 13**, Chavanne teaches all as applied to claim 10 above, in addition Chavanne teaches an apparatus wherein radiation which enters the element for a first time follows a first path and the reflecting member is configured to reflect radiation back into the element such that the reflected radiation follows a second path, said second path being said first path reversed and displaced along said rotation axis (the incoming light into element (15) of Fig. 1 follows the same path after reflecting off of mirror (30)) (Fig. 1-4).

Regarding **claim 15**, Chavanne teaches a method for varying the path length of a beam of radiation, the method comprising:

- providing an element (15) comprising two reflective surfaces in fixed relation to one another such that radiation may be reflected between said reflective surfaces and out of the element;
- rotatably mounting said element about an axis (37); and
- rotatably oscillating said element about said axis (as element (15) rotates, it oscillated between π and $-\pi$ radians) (col.2 ln.25-35, col.2 ln.46-67, col.4 ln.51-col.5 ln.8).

Regarding **claim 16**, Chavanne teaches all as applied to claim 1 above, in addition Chavanne teaches a system for investigating a sample, the system comprising:

- an emitter (radiation source (3) Fig. 1) for emitting radiation to irradiate said sample (transparent object (1));
- a detector (detector (7)) for detecting radiation reflected from or transmitted by said sample, radiation travelling from the emitter to the detector following a first path (the sample arm interferometer in Fig. 1 including elements (26, 26, 1));
- means for supplying radiation along a second path (the reference arm of the interferometer in Fig. 1 including elements (31, 15, 30)) to said detector and having a phase related to that of the radiation leaving the emitter, the system further comprising an apparatus according to claim 1 ((15) Fig. 1 as is shown above), provided within either of the first or second paths (col.4 ln.7-col.5 ln.8).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chavanne et al. (**US Patent 6,144,456**) ("Chavanne") in view of Horii et al. (**US Application 2005/0168751**) ("Horii").

Regarding **claim 2**, Chavanne teaches all as applied to claim 1 above, in addition Chavanne is silent to an apparatus where the driving means comprises a galvanometer.

Horii teaches using a galvanometer in with a reflecting element and a controller to control a path length ([0098]-[0102]). It is well known that galvanometers have high precision for controlling angles ([0098]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus from Chavanne with the galvanometer from Horii to control the angle of reflection with high precision.

Regarding **claim 3**, Chavanne and Horii teach all as applied to claim 2 above, in addition Chavanne teaches an apparatus where said driving means is configured to vary the speed of the element during each oscillation such that the path length is varied linearly with time (col.7 ln.44-49).

Regarding **claim 4**, Chavanne teaches all as applied to claim 1 above, in addition Chavanne is silent to an apparatus wherein said driving means is configured to oscillate said element through an angle of at most 40°.

Horii teaches using a galvanometer in with a reflecting element and a controller to control a path length ([0098]-[0102]). The galvanometer and the galvanometer controller from Horii are configured to oscillate the reflective element through any angle, including an angle at most of 40°. It is well known that galvanometers have high precision for controlling angles ([0098]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus from Chavanne with the galvanometer from Horii to control the angle of reflection with high precision.

Allowable Subject Matter

Claims 7 & 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

As to **claim 7**, the prior art of record, taken alone or in combination, fails to disclose or render obvious an apparatus for varying the path length of a beam where the solid optic is a

rhomboid prism and the reflecting surfaces are two facing surfaces of said rhomboid prism, in combination with the rest of the limitations of the claim.

As to **claim 14**, the prior art of record, taken alone or in combination, fails to disclose or render obvious an apparatus for varying the path length of a beam wherein said reflecting member is a first reflecting member and the apparatus further comprises a second reflecting member, said first and second reflecting members being configured such that radiation may be reflected back through said element at least four times, in combination with the rest of the limitations of the claim.

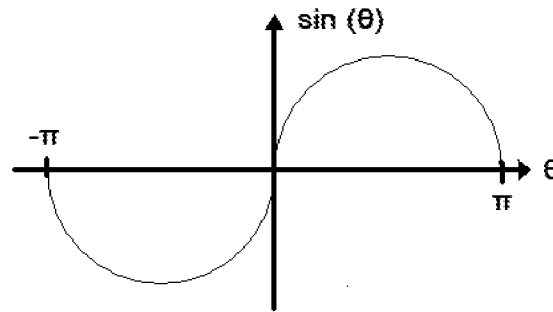
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 4/18/2008 regarding the 103 rejection of claims 1 & 15 have been fully considered but they are not persuasive. The element (15) from Chavanne does oscillate about an axis. As was stated before the element is oscillating between π and $-\pi$ radians. This is best demonstrated by observing the periodic oscillatory function $\sin(\theta)$ (shown below). The sine function is a one dimensional projection of uniform circular motion. As element (15) rotates around the axes it will also oscillate around the same axis as is shown by the one dimensional projection of its uniform circular motion. In addition, due to this motion of element (15), the beam (41e) will oscillate across the reflector (30) due to the oscillatory motion of

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element (15). The beams oscillation will be at a higher frequency than the element's (15) oscillation frequency.



The objections to the drawings are withdrawn due to the applicant's amendment.

The objections to the specification are withdrawn due to the applicant's amendment.

Conclusion

Art of interest considered particularly relevant to the applicant's application includes Yoshikawa (US Patent 5,243,404) (see Fig. 2, 5, & 6).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in the previous Office Action mailed 10/18/2007. The applicant must seasonably challenge well known statements and statements based on personal knowledge. See MPEP 2144.03; *In re Selmi*, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); *In re Fischer*, 125 F.2d 725, 52 USPQ 473 (CCPA 1942); and *In re Boon*, 439 F.2d 724, 169 USPQ 231 (CCPA 1971).

A challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice. To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art, a general allegation that the claims define a patentable invention being inadequate.

A seasonable challenge constitutes a challenge made as soon as practicable during prosecution. Thus, the applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well-known statement was made. If the applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art.

The applicant has not presented a traversal in the Amendment filed 4/18/2007, thus the well-known statement is taken to be admitted prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Skovholt whose telephone number is (571) 270-1303. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. S./
Jonathan Skovholt
Patent Examiner
Art Unit 2877

/Patrick J Connolly/
Primary Examiner, Art Unit 2877